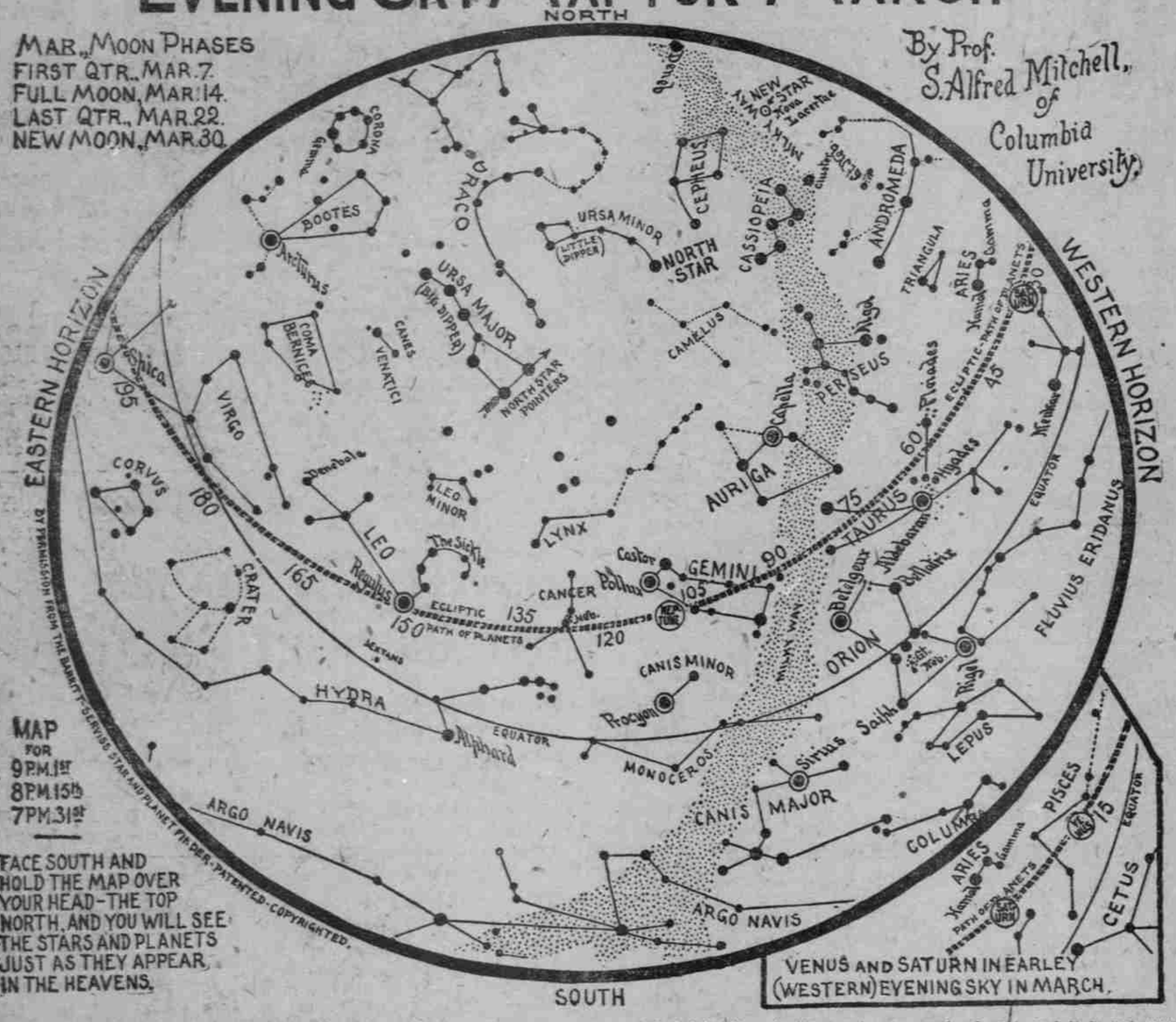
EVENING SKY MAP FOR MARCH



OUR OLD MOTHER EARTH IS the most perfect running mechanism that we know of. It turns on its axis without friction, and so uniform is its rate of speed that astronomers with their most refined observations, stretching over about 5000 years, have not been able to detect a change in the length of the day of as small an amount as the one-hundredth of a second. Our meridian might be likened to the minute hand of an ordinary clock, which passes over the dial of the celestial clock, whose numerals are the brilliant stars, glorious suns set in the vast firmament.

The sun in its apparent motion among the stars might be likened to the hour hand of the celestial clock, which passes over the numerals of God's dial with mystic slowness, taking one year to make a complete circuit, instead of 12 hours as in the ordinary clock. Each time that the minute hand on the clock comes to XII a new hour begins; each time the meridian comes to the vernal equinox in the sky a new sidereal day begins. The minute hand passes the figures XII on the dial 12 times in 12 hours; it catches up to the hour hand only eleven times or one time less. In the celestial clock, the meridian passes the vernal equipox 366 times, but overtakes the sun one time less, or 365 times. Hence sideral time gains one day in a year, or two hours every month. On March 21 the sun is at the vernal equinox, and as a result clocks which keep star time and sun time agree in registering the same hours.

To have the sun a good time-keeper, it would be necessary for it to move in a plane perpendicular to the earth's axis of rotation which is called the celestial equator. The sun, however, moves in the ecliptic inclined at an angle 23½ degrees to the equator. If the sun moved uniformly in the ecliptic it is readily seen that it would not give uniform time, for in March and September its motion is much inclined to the equator, while in June and September it moves parallel to the equator. But the sun does not move uniformly in the ecliptic. On January 1, in spite of the cold weather, the sun is three million miles closer to the earth than it is on July 1, and as a consequence of this nearness it moves quicker in its orbit, and it takes the meridian more than the average time to catch up to the sun. Hence, the intervals of time elapsing between successive returns of the sun to the meridian are not constant, and as a matter of fact, this interval (which we call a solar day) is 51 seconds longer on December 23 than it is on September 1s.

Sun Poor Time Keeper.

Thus, since solar days are all of unequal lengths, the sun is a poor time-keeper. The average length of all the days of the year is called a mean solar day, and this time being uniform may be kept by clocks and watches. In the ordinary almanacs we read, "Sun is fast" or "Sun is slow." On November 4 the sun is fast, and reaches the meridian 16m. 20s. before 12 oclock. On February 12 the sun is slow by 14m. 25s. The amount that the sun is fast or slow is called by the astronomers the "equation of Time."

December 22 is the "shortest day in the year," it has the fewest hours of daylight, because the sun is then farthest south of the equator. But on account of the equation of time, this does not mean that the sun on that day rises the latest or sets the earliest. For New York city, the sun rises the latest for the year on January 5 at 7:20 a. m.; it sets the earliest on December 10, at 4:29 p. m., neither of these dates being December 22. The sun's change in declination around Christmas time being very slight, the change in the amount of daylight is very little; but with the sun moving in its orbit at nearly its greatest speed and almost parallel to the equator, it is losing time, running slow each day by nearly 30 seconds. "Noon" comes later each day on the clock. The number of hours from sunrise to noon on one day is almost equal to the number of hours from noon to sunset, but the time of noon thus changing causes the sun to rise not the latest by the clock nor set the earliest on the shortest day of the year. In January the days lengthen out most in the afternoons. In New York the sun rises on January 1 at 7:20 a. m., at the end of the month at 7:08 a. m.; a total change for the month of 12 minutes; it sets on New Year's day at 4:38 p. m., and on January 31 at 5:12 p. m., a change of 34 minutes in the time of sunset. There are many questions concerning time which are of great interest to the amateur astronomer.

New Stars.

At this time of year there is a wonderful difference in the appearance of the two halves of the sky visible in the early evening, and this is shown by a glance at the map above. The right half of the map, or west of the meridian as we face south, presents the most beautiful constellations of the whole heavens, with Cassiopeia, Andromeda, Perseus with Algol, Auriga with Capella, the Pleiades, the Hyades, Orion, the Twins, and the Big and Lesser Dog constellations, with Sirius and Procyon outside of the big Dipper, which can be claimed specially by no month of the year, there is east of the meridian little of interest, but Regulus and Arcturus.

Within the past six months no less than four "new" stars have been discovered. The first three were revealed through a study of photographic plates at Harvard college, the fourth was found visually by the Rev. T. E. Espin, of England, on December 20.

The star was not visible on the photograph taken at the Harvard college observatory on November 17, 1910, but was of the fifth magnitude on November 28, and so had faded considerably before being discovered.

Observations of this star place it in the small constellation of Lacerta at right ascension 22 h 32m 12s, and declination 52 deg. 15 min. 20 sec. north, and it has consequently been called Nova Lacertae. Spectroscopic observations show it to be a typical new star, with bright lines in the spectrum signifying a conflagration. This star was found on photographic plates taken by professor Barnard as early as 1893, when it was of the 14th magnitude. A catastrophe of some kind has caused a sudden flaring-up to a star brighter than the eighth magnitude, an increase of brightness more than a hundred fold.

The Planets.

At the beginning of the month Venus sets due west at 7:30 p. m. At the end of the month it sets more than half an hour later. It is slowly increasing its angle from the sun, becoming more readily visible each night. In the telescore it appears gibbous, showing 90 percent. of the whole surface. Even at the end of March, Venus is but one-third as bright as it will be early in August.

Mars is separating itself from the line of the sun with great slowness, and it is still difficult to see. It is a moving star and throughout the month of March does not rise till long after 3 oclock. Its great southern declination causes it to rise about 25 deg. south of east, and it is not very high above the horizon when the streaks of dawn come along. It gives little promise now of the brilliant object it will be in the autumn.

On the first of March, Jupiter becomes stationary in the sky, and then begins its retrograde motion toward the west among the stars. At the first of the month it rises about 11 oclock over 15 degrees south of east, and 30 days later it will rise two hours earlier. To those ardent amateurs who do not object to remaining up late at night, it presents a fine object in the telescope.

Saturn is still well visible in the evening sky to the west shortly after sunset. It is about 10 oclock when it sets on the first of the month. It sets a little after 8 at the end of the month. Users of telescopes had best make the most of their opportunities this month.

Neptune may be found with a small telescope from the position given in the map. It shaws as an eighth magnitude star in right ascension 7h 21m and declination 21 deg. 30 min. north.

RENE BACHE'S BUDGET.

PUTTING BACK THE FORESTS

TWENTY TONS OF PINE SEED FOR REPLANTING BURNED AREAS.

Developing a New Branch of Forest Work Which Requires The Use of Complex Machinery—Contrivances for Picking the Seeds Out of Pine Cones, Cleaning Them, and Removing Their "Wings." 30,000,000 Tree Seeds to a Ton.

TWENTY tons of tree seeds! It seems a fabulous quantity; but all of it and more too will be required to replant the great areas which were stripped of their forest cover by the frightful conflagrations of last autumn in Idaho, Montana, and neighboring states.

The forest service is making ready to tackle the job of replacing the burned trees, and for this purpose, its agents have recently collected, in the Black Hills of South Dakota, the largest supply of pine cones ever got together. It has paid for them an average price of about 75 cents a bushel, a large share of the money being earned by the women of Custer, Hill City, and other towns in that region, who, eager to take advantage of such a chance to gain pin money, have gone into the forests on horseback, filling sacks with the cones, and delivering them at central points.

Boys and Girls Help.

Boys and girls have had their own share in the work, doing much of the necessary and often arduous climbing; ladders and sharp hooks on the ends of long poles have been brought into requisition; and, wherever lumbering was going on, the pickers have followed the sawyers and taken the cones from the newly-felled trees. Meanwhile, the men have made use of wagons and tall boxes, receiving from $30 to $40 a load.

Squirrels' nests yield quantities of the finest and most desirable pine seeds, because these are found in the cones which ripen near the ends of the topmost boughs, where it is difficult even for the most expert climbers to reach them. Occasionally a single such hoard will yield from $5 to $8 worth of cones—a prize indeed to the finder. One bushel of cones is expected, on an average, to yield one pound of seeds, which run about 30,000,000 to the ton. Thus it may be judged on what a wholesale scale the forest service is prosecuting this undertaking.

The gathering of the cones, however, is only the beginning of the business. When they are delivered by the collectors, they have to be examined and sorted carefully, many of them being infested by injurious insects. These and all damaged ones are thrown out and not accepted. For the good ones a somewhat elaborate process of treatment is necessary before the seeds can be used for planting. It is not very difficult, but demands labor.

Extracting the Seed.

First it is requisite to get the seeds out of the cones—a task originally performed by hand picking. This was found exceedingly laborious, however, and very hard on the hands. Accordingly, the expedient was adopted of spreading the cones on sheets in the open air and exposing them to sunshine, when, after a while, they would open, and the seeds would fall out—to be afterwards separated by sifting. This method, indeed, is still practiced to some extent—an important feature of it being the covering of the cones with cloths at night, to prevent them from shutting their capsules again.

But a better way to accomplish the result, as experience has proved, is by hot-air drying, recent improvements in which are part of the development of a complex system of labor-saving machinery for the separation and cleaning of the tree seeds. One machine, newly put into use at Custer, is a belt bucket-conveyer, operated by gasoline, which handles 100 bushels of cones in 15 minutes, carrying them to the top of a building, and dumping them through a hole in the roof into a loft, whence they are transferred to screen-bottomed trays in drying rooms. Big stoves furnish the requisite dry heat.

Another contrivance used is a huge cylindrical sieve, which is made to revolve while the cones (previously opened by hot air) are poured into it through a hopper at one end. The cylinder being inclined from the hopper downward, the seeds fall out through the sieve-meshes while the cones are passing along it. As might be expected, this process does not get all the seeds out of the cones, and so the latter are finally put through a sort of threshing machine to separate the remainder.

Removing the Wings.

Even when this has been accomplished, however, it is still necessary to remove the "wings" from the seeds. For, as most of us have noticed, thoughtful nature has provided each pine seed with a wing-like appendange which is obviously intended to enable it to fly, in falling, some distance away from the parent tree. To get rid of these appendages, the seeds are either kneaded in sacks, and afterwards sifted, or put through a fanning mill. They must be cleaned, as a final operation, and the fanning mill accomplishes this part of the work better than any other contrivance.

Curious Nature Story.

The most difficult cones to treat, by far, are those of the lodgepole pine; and thereby hangs a very curious nature story. In the forests, the cones of this species of pine hang on the trees for years, and, as a rule, do not seem to open at all, unless a big fire comes along. Then the heat of the flames melts the pitch that seals the capsules, and the seeds drop out. It is as if nature's intention was to hold them in reserve for replanting purposes when the woods should chance to be burned.

To extract the lodgepole pine seeds by artificial means is a troublesome problem. Steam has been tried, to unseal the capsules, but it is liable to cook the seeds incidentally, thus interfering with the prospect of germinating. Up to date, the best method discovered seems to be to soak cones in warm water, which partly dissolves the pitch, and then to expose them to dry heat.

Twenty-four Nurseries.

There are now 24 national forest nurseries, with an annual producing capacity of over 8,000,000 seedling trees. But it costs a good deal of money to raise and plant such seedlings, and a quicker and cheaper method is demanded for replanting extensive burned areas. With this idea in view, the forest service is now making experiments on quite a large scale. The broadcasting of tree seed (as wheat is sown) has been found to give excellent results in the Black Hills and certain other regions, though much of it is eaten under such circumstances by birds and various rodents such as field mice, ground squirrels and gophers. Rabbits, unfortunately, are very fond of little trees, whether nursery transplants or field-grown seedlings, and this is a special problem that is now receiving close attention.

Experience has shown that one of the best ways to plant tree seed is to sow it on top of snow in early spring. Thus, when, later on, it finds its way to the ground, there is plenty of moisture at hand to assist its germination. In different regions different methods have to be adopted, and in some parts of the country tree planting is best accomplished with the help of a corn-planter.

The Fires of August.

The fires of last summer and fall in the west killed 76 men temporarily employed by the government in fighting them. Most disastrous were those which in August swept through northern Idaho and Montana. Near the end of that month many fires were burning, but nearly all were under control. With reasonably calm weather, all of them would have been extinguished in a short time, but on Aug. 20 a terrific hurricane arose, which lasted 24 hours. It raged so fiercely that in many places the forest was blown flat in advance of the fire, and a number of fire fighters were killed by falling trees. At one time in Idaho, there was an almost continuous line of fire for 100 miles covering an area of fully 1,000,000 acres.

These great fires burned over a total of about 4,000,000 acres, or 6250 square miles. To repair the damage wholly will require a great many years; but repaired it will be, in the course of time, through the scientific and comprehensive system of replanting which the forest service has inaugurated.

Rene Bach.

Bride and Groom Die Together.

Redding, Cal., March 4.—Clasped in an embrace of death that had not been disturbed since Sunday evening, C. M. O'Brien, aged 28, and his 20-year-old bride were found in bed in their apartment last night, he with a bullet hole through his right temple and she with a similar penetration over her right ear. The bed clothes had been pulled over their heads to muffle the sound of the two shots.